

Title: **Anatomy and Terminology III – Cardiovascular**

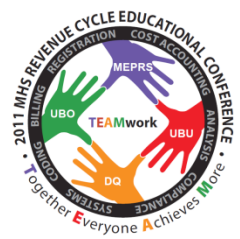
Session: **M-6-1530**



# Objectives

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- Have fun
- Remember a few things about the cardiovascular system that you knew before and forgot
- Learn at least one new thing



# Take the Pre-Quiz!

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- What are some of the differences between arteries and veins?
- What are the two major groups of problems with the cardiovascular system?
- What types of ICD-10-PCS root operations are done on the cardiovascular system?



# Introduction, Cardiovascular

- Functions
  - Transport nutrients
  - Transport oxygen and carbon dioxide
  - Transport wastes from cells to excretory organs (e.g., kidney)
  - Transport hormones from endocrine organs to target organs
  - Protect body against disease by identifying and attacking foreign macromolecules
  - Regulate temperature
  - Regulate fluid and salt balance

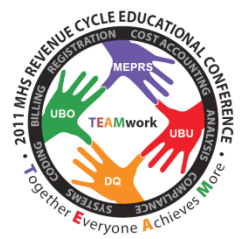




# Introduction, Cardiovascular

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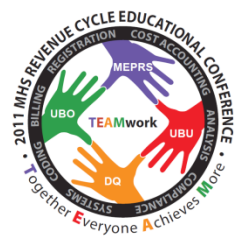
- Plumbing
- Weak pipes (aneurism)
- Leaky pipes (edema)
- Hole in a pipe (stroke)
- Clogged pipe (atherosclerosis)
- Low pressure (varicose veins, hypotension)
- High pressure (hypertension)
- Electrical
- Blown fuse (sinoatrial node)
- Bad wire connection (bundle blocks)
- In general, what causes the heart rate to increase or decrease?
- Hint: My favorite body system



# Introduction, Cardiovascular

## Let's look at the Direct Care MTF Diagnosis Numbers

Diagnosis 1	FY Inpt Detail D/C Raw Dx 390-459.9	Dispositions, Raw #>200	
401.9	ESSENTIAL HYPERTENSION, UNSP	785	plumbing
403.90	HYPERT HEART,UNSP, WO HRT FAIL	211	plumbing
410.71	MI,SUBENDCARD,INIT EPISODE	826	plumbing
411.1	INTERMED CORONARY SYND	319	plumbing
414.00	CORO ATHERO UNSP NATIVE GRAFT	287	plumbing
414.01	CORO ATHERO OF CORONARY ARTERY	1,806	plumbing
415.19	OTHER PULMON EMBOL & INFARCT	750	plumbing
427.31	ATRIAL FIBRILLATION	1,519	electrical
427.32	ATRIAL FLUTTER	230	electrical
427.89	CARDIAC DYSRHYTHMIAS NEC	706	electrical
428.0	CONGESTIVE HEART FAILURE, UNSP	1,447	plumbing
428.30	UNSPEC DIASTOLIC HEART FAILURE	218	plumbing
428.33	ACUT ON CHRON DIASTOL HRT FAIL	246	plumbing
433.10	CAR ART OCCLUS/STEN, WO CI	246	plumbing
434.91	CEREBRAL ART OCCLUS, NOS, W CI	615	plumbing
435.9	TRANS CEREB ISCHEMIA NOS	557	plumbing
458.0	ORTHOSTATIC HYPOTENSION	327	plumbing



# Introduction, Cardiovascular

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## Electrical and Plumbing

- Electrical
  - ICD-9-CM 426 Conduction disorders
  - ICD-9-CM 427 Cardiac dysrhythmias
- Plumbing – just about everything else, e.g.,
  - ICD-9-CM 428 Heart failure: mechanical inadequacy; caused by inability of heart to pump and circulate blood; results in fluid collection in lung, hypertension, congestion and edema of tissue



# Introduction, Cardiovascular

## Inpatient Procedures for CV Diagnoses

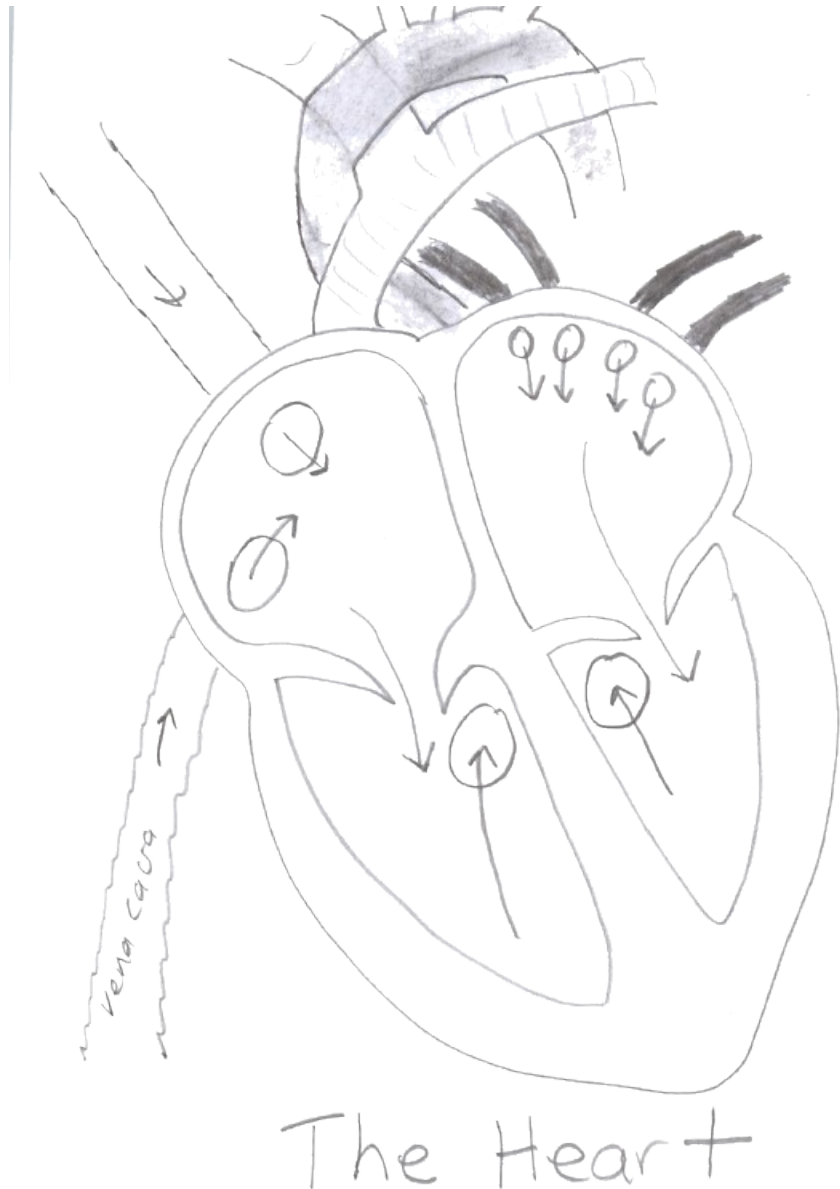
ICD Pro	SIDR Fy2010 Dx1 390-459.9 Procedure	qty >300	
00.40	PROCEDURE ON SINGLE VESSEL	730	plumbing
00.45	INSERTION, ONE VASCULAR STENT	533	plumbing
00.66	PTCA OR CORONARY ATHERECTOMY	1,282	plumbing
36.07	INS DRUG-ELUT CORON ART STENTS	967	plumbing
36.15	1 INT MAM-COR ART BYPASS	372	plumbing
37.22	LEFT HEART CARDIAC CATH	2,113	plumbing
37.23	RT/LEFT HEART CARD CATH	387	plumbing
37.26	Catheter based invasive electrophysiologic testing	404	electrical
37.34	Excision/ destruct other heart lesion/tissue	383	electrical
38.93	VENOUS CATHETER NEC	327	misc
39.61	EXTRACORPOREAL CIRCULAT	385	misc
39.95	HEMODIALYSIS	410	looking around
87.03	C.A.T. SCAN OF HEAD	401	looking around
87.41	C.A.T. SCAN OF THORAX	324	looking around
88.41	CONTR CEREBR ARTERIOGRAM	379	plumbing
88.48	CONTRAST ARTERIOGRAM-LEG	548	plumbing
88.53	LT HEART ANGIOCARDIOGRAM	836	plumbing
88.56	CORONAR ARTERIOGR-2 CATH	2,058	plumbing
88.72	DX ULTRASOUND-HEART	2,861	looking around
88.91	MRI OF BRAIN AND BRAIN STEM	446	plumbing
89.54	ELECTROCARDIOGRAPH MONIT	310	electrical
99.04	PACKED CELL TRANSFUSION	1,287	misc

- About 10,000 plumbing; 1,000 electrical



# Anatomy - Let's All Draw A Heart...

- Draw this on the back of a piece of paper, label the parts
  - return from the body
  - vena cava
  - right atrium (tricuspid)
  - right ventricle (pulmonary)
  - pulmonary artery
  - pulmonary arterioles
  - pulmonary capillaries
  - pulmonary venules
  - pulmonary veins
  - left atrium (mitral)
  - left ventricle (aortic)
  - aorta





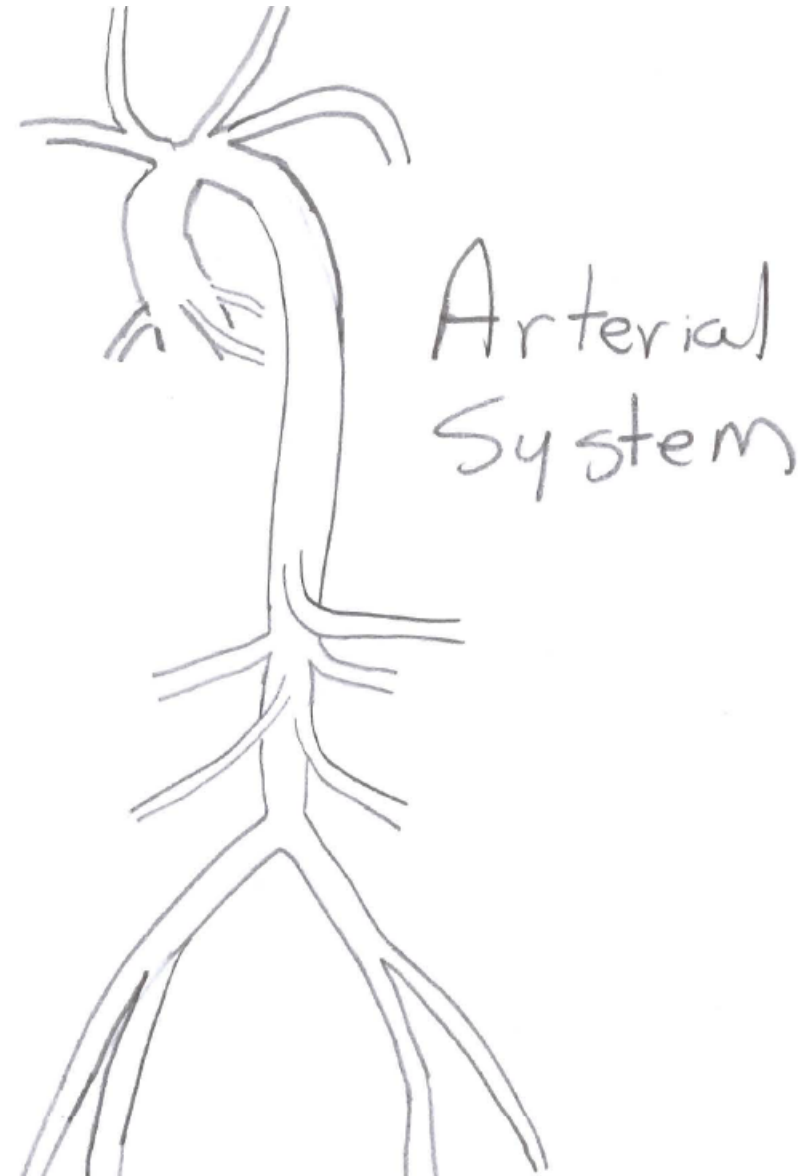
# Anatomy - Coronary Circulation

- Ascending aorta → left coronary artery → divides into
  - (1) anterior descending branch (supplies walls of both ventricles)
  - (2) circumflex branch (supplies walls of left ventricle and left atrium)
- Ascending aorta → right coronary artery → divides into
  - (1) posterior descending branch (supplies blood to walls of both ventricles)
  - (2) marginal branch (supplies the right atrium and ventricle)
- **Drains into coronary sinus which empties into ??**
  - **Hint: Where does all unoxygenated blood enter the heart?**

# Anatomy

Let's draw the arterial system...

- A. Brachiocephalic
- B. Right subclavian
- C. Right common carotid
- D. Left common carotid
- E. Left subclavian
- F. Ascending aorta
- G. Carotid arteries
- H. Descending aorta
- I. Celiac (one)
- J. Renal (pair)
- K. Superior mesenteric
- L. Inferior mesenteric
- M. Common iliac
- N. Femoral





# Cardiovascular

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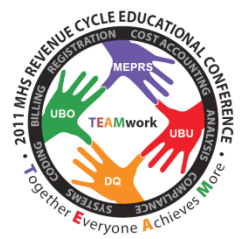
- If an embolism occurs in the venous system, where will it settle down and establish a permanent home?
- If an embolism occurs in the arterial system, where does it set up housekeeping?
- If the embolism is from the heart – where, other than the extremities, can the embolism clog up the works?
- Take a guess – will most of the hospitalizations be for problems with the pump OR with clogs distal to the pump?



# Terminology - Cardiovascular Procedures

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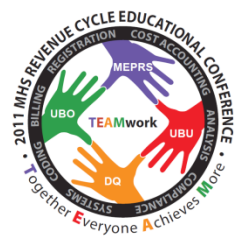
- In ICD-10-PCS these are the root operations for the non-diagnostic imaging ICD-9-CM procedures
- Bypass: Altering the route of passage of the contents of a tubular body part
- Destruction: Physical eradication of all or a portion of a body part by the direct use of energy, force, or a destructive agent
- Dilation: Expanding the orifice or the lumen of a tubular body part
- Division: Cutting into a body part, without draining fluids and/or gases from the body part, in order to separate or transect a body part
- Excision: Cutting out or off, without replacement, a portion of a body part



# Terminology - Cardiovascular Procedures

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- Extirpation: Taking or cutting out solid matter
- Fragmentation: Breaking solid matter in a body part
- Insertion: Putting in a non-biological appliance that monitors, assists, performs, or prevents a physiological function but does not physically take the place of a body part
- Inspection: Visually and/or manually exploring a body part
- Map: Locating the route of passage of electrical impulses and/or locating functional areas in a body part
- Occlusion: Completely closing an orifice or the lumen of a tubular body part



# Terminology - Cardiovascular Procedures

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- Release: Freeing a body part from an abnormal physical constraint
- Removal: Taking out or off a device from a body part
- Repair: Restoring, to the extent possible, a body part to its normal anatomic structure and function
- Replacement: Putting in or on biological or synthetic material that physically takes the place and/or function of all or a portion of a body part
- Reposition: Moving to its normal location, or other suitable location, all or a portion of a body part
- Resection: Cutting out or off, without replacement, all of a body part



# Terminology - Cardiovascular Procedures

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- Supplement: Putting in or on biological or synthetic material that physically reinforces and/or augments the function of a portion of a body part
- Restriction: Partially closing an orifice or the lumen of a tubular body part
- Revision: Correcting, to the extent possible, a portion of a malfunctioning device or the position of a displaced device
- Transplantation: Putting in or on all or a portion of a living body part taken from another individual or animal to physically take the place and/or function of all or a portion of a similar body part





# Heart Diseases - Atherosclerosis

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- See Arteriosclerosis
- Too much pressure (which is why we don't have that much venous sclerosis)
- Makes arteries hard (sclerosis)
- Atherosclerosis
  - Heart – symptoms like heart attack, pain
  - Leading to brain – symptoms like stroke
  - Leading to extremity – claudicating
- Risk factors – getting old, hypertension, high cholesterol, diabetes, obesity, smoking, family hx of aneurysm



# Heart Diseases

- Acute Myocardial Infarction (AMI)
  - ST elevation myocardial infarction (STEMI)
    - Changes in EKG due to prolonged blockage
    - Part of the heart muscle is damaged
    - ICD-9-CM Code with 410.0-410.6, 410.8
  - Non ST elevation myocardial infarction (NSTEMI)
    - No changes in the EKG
    - Markers in the blood indicate damage occurred to heart muscle
    - Blockage may be partial or temporary so damage is minimal
    - Site of blockage may or may not be documented
    - ICD-9-CM Code with 410.7 Subendocardial Infarction



# Heart Diseases

- Acute Myocardial Infarction (AMI)
  - Nontransmural infarction
    - ICD-9-CM Code with 410.7 Subendocardial Infarction
  - Unspecified, code with 410.9
    - If only “STEMI” or “transmural MI” but no location, ICD-9-CM code 410.9
  - If STEMI becomes a NSTEMI (due to thrombolytic therapy) still code as STEMI
  - If NSTEMI becomes STEMI, code as STEMI



# Heart Diseases

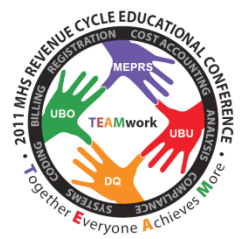
- Acute Myocardial Infarction (AMI) in ICD-9-CM
  - 5th digit
    - 0 – Episode of care unspecified
    - 1 – Initial episode (no matter number of times transferred) of a newly diagnosed myocardial infarction
    - 2 – Subsequent episode, admitted for further observation, evaluation or treatment within 8 weeks of the myocardial infarction
  - Need to know location of the damage
    - Anterolateral, inferolateral, posterior, atrium...



# Heart Diseases

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- Coronary Atherosclerosis – narrowing caused by plaque
- Coronary Arteriosclerosis – thickening and loss of elasticity of the coronary arterial walls
- Arteritis or endarteritis – arterial wall inflammation
- Atheroma – plaque of degenerated, thickened arterial intima
- Sclerosis – hardening from causative effect
- Stricture – decrease in arterial lumen diameter
- Aneurysm
- Chronic Total Occlusion of Coronary Artery
- Coronary Atherosclerosis Due to Lipid Rich Plaque
- Valve diseases



# Other Cardiovascular Diseases

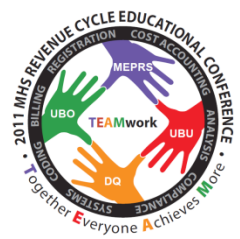
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- Stroke / Cerebral Infarction / Cerebrovascular Accident (CVA)
- Hypertension



# Cardiac Terms - Parts

<b>Section</b>	<b>0</b> Medical and Surgical		
<b>Body System</b>	<b>2</b> Heart and Great Vessels		
<b>Operation</b>	<b>5</b> Destruction: Physical eradication of all or a portion of a body part by the direct use of energy, force, or a destructive agent		
<i>Body Part</i>	<i>Approach</i>	<i>Device</i>	<i>Qualifier</i>
<b>4</b> Coronary Vein <b>5</b> Atrial Septum <b>6</b> Atrium, Right <b>7</b> Atrium, Left <b>8</b> Conduction Mechanism <b>9</b> Chordae Tendineae <b>D</b> Papillary Muscle <b>F</b> Aortic Valve <b>G</b> Mitral Valve <b>H</b> Pulmonary Valve <b>J</b> Tricuspid Valve <b>K</b> Ventricle, Right <b>L</b> Ventricle, Left <b>M</b> Ventricular Septum <b>N</b> Pericardium <b>P</b> Pulmonary Trunk <b>Q</b> Pulmonary Artery, Right <b>R</b> Pulmonary Artery, Left <b>S</b> Pulmonary Vein, Right <b>T</b> Pulmonary Vein, Left <b>V</b> Superior Vena Cava <b>W</b> Thoracic Aorta	<b>0</b> Open <b>3</b> Percutaneous <b>4</b> Percutaneous Endoscopic	<b>Z</b> No Device	<b>Z</b> No Qualifier



# Circulatory in ICD-10-PCS

- Example of first listed cardiac procedures look like in ICD-10-PCS
- Bypass

<i>Section</i>	<b>0</b>	Medical and Surgical	
<i>Body System</i>	<b>2</b>	Heart and Great Vessels	
<i>Operation</i>	<b>1</b>	Bypass: Altering the route of passage of the contents of a tubular body part	
<i>Body Part</i>	<i>Approach</i>	<i>Device</i>	<i>Qualifier</i>
<b>0</b> Coronary Artery, One Site <b>1</b> Coronary Artery, Two Sites <b>2</b> Coronary Artery, Three Sites <b>3</b> Coronary Artery, Four or More Sites	<b>0</b> Open	<b>9</b> Autologous Venous Tissue <b>A</b> Autologous Arterial Tissue <b>J</b> Synthetic Substitute <b>K</b> Nonautologous Tissue Substitute	<b>3</b> Coronary Artery <b>8</b> Internal Mammary, Right <b>9</b> Internal Mammary, Left <b>C</b> Thoracic Artery <b>F</b> Abdominal Artery <b>W</b> Aorta
<b>0</b> Coronary Artery, One Site <b>1</b> Coronary Artery, Two Sites <b>2</b> Coronary Artery, Three Sites <b>3</b> Coronary Artery, Four or More Sites	<b>0</b> Open	<b>Z</b> No Device	<b>3</b> Coronary Artery <b>8</b> Internal Mammary, Right <b>9</b> Internal Mammary, Left <b>C</b> Thoracic Artery <b>F</b> Abdominal Artery
<b>0</b> Coronary Artery, One Site <b>1</b> Coronary Artery, Two Sites <b>2</b> Coronary Artery, Three Sites <b>3</b> Coronary Artery, Four or More Sites	<b>3</b> Percutaneous	<b>4</b> Drug-eluting Intraluminal Device <b>D</b> Intraluminal Device	<b>4</b> Coronary Vein
<b>0</b> Coronary Artery, One Site <b>1</b> Coronary Artery, Two Sites <b>2</b> Coronary Artery, Three Sites	<b>4</b> Percutaneous Endoscopic	<b>4</b> Drug-eluting Intraluminal Device <b>D</b> Intraluminal Device	<b>4</b> Coronary Vein





# Quiz!!!

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## Differences between Arteries and Veins except for the Pulmonary artery and veins

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)

**What are some  
differences?**



# Quiz!!!

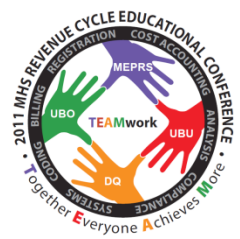
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## Major types of heart problems?

1)

2)

No, for those of you who just woke up, not looking for “broken”



# Quiz!!!

## Cardiovascular root operations

1)

2)

3)

4)

5)

6)

7)

8)

9)

10)

11)

12)

13)

14)

15)

16)

17)

18)

19)



# Review

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- What are some of the differences between arteries and veins?
- What are the two major groups of problems with the cardiovascular system?
- What types of ICD-10-PCS root operations are done on the cardiovascular system?